भारतीय मानक
Indian Standard

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खाद्य तेल के स्टेनलेस स्टील रोड टैंकर — विशिष्टि

Stainless Steel Road Tankers for Edible Oils — Specification

ICS 23.020.20

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

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Oils and Oilseeds Sectional Committee, FAD 13

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Oils and Oilseeds Sectional Committee had been approved by the Food and Agriculture Division Council.

The edible oil tankers are used to transport edible oil in bulk form by road. This standard covers the tanks made in stainless steel only. The tankers are designed to be mounted on trucks or built on a semi-trailer. The capacity and the type of tanker has to be decided based on volume of the edible oil to be moved, the distance to be covered and the road regulations.

The objective of this standard is to set safe practices for construction and better hygiene of road tankers used for bulk transportation of edible oils. Stainless steel is used worldwide for storage and transportation of food materials due to minimum risk of contamination, ease of cleaning and longer service life.

The design of the road tanker including the tank, the vehicle and vehicle accessories, etc, shall meet all requirements laid down by Statutory Authorities.

The composition of the Committee responsible for formulation of the standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

STAINLESS STEEL ROAD TANKERS FOR EDIBLE OILS — SPECIFICATION

1 SCOPE

1.1 This standard covers the basic requirements for the design, construction and inspection of stainless steel edible oil road tanker of various capacities for transporting all crude or processed edible oil and fats in bulk.

1.2 The purchaser is required to make arrangements for the truck chassis or the semi-trailers, get the drawings and axle load approved by the local transport authorities, as well as arrange to mount the tanker thereon.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard. At the time of publication, the editions indicated are valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the following standards:

IS No.	*Title*
1182 : 1983	Recommended practice for radiographic examination of fusion welded butt joints in steel plates (*second revision*)
1278 : 1972	Specification for filler rods for gas welding (*second revision*)
2811 : 1987	Recommendations for manual tungsten inert-gas arc welding of austenitic Stainless Steel (*first revision*)
3382 : 1965	Specification for stainless steel milk pipes and — Fittings
3658 : 1999	Code of practice for liquid penetrant flaw detection (*second revision*)
4853 : 1982	Recommended practice for radiographic inspection of fusion welded butt joints in steel pipes (*first revision*)
6911 : 2017	Stainless steel plate, sheet and strip — Specification (*second revision*)

3 TANK DESIGN

3.1 Tanker Construction

3.1.1 *General Guidelines*

The maximum edible oil carrying capacity shall be as per the guidelines of Road and Transport Regulation Authorities. The tank shall have compartmentalized construction with maximum compartment capacity not exceeding 5 kl. Figures 1 and 2 may be used as a reference guide for construction of stainless steel edible oil tanker of 12 and 16 kilo liter capacities. Bigger capacity tankers can also be constructed by increasing the length of tank and number of compartments as per similar construction. Suitable partition, baffle and stiffeners may be used, consisting of stainless steel grades as specified in Table 1.

Table 1 Stainless Steel Grades for construction of Tankers

(*Clauses* 3.1.1, 3.1.4, 4.3)

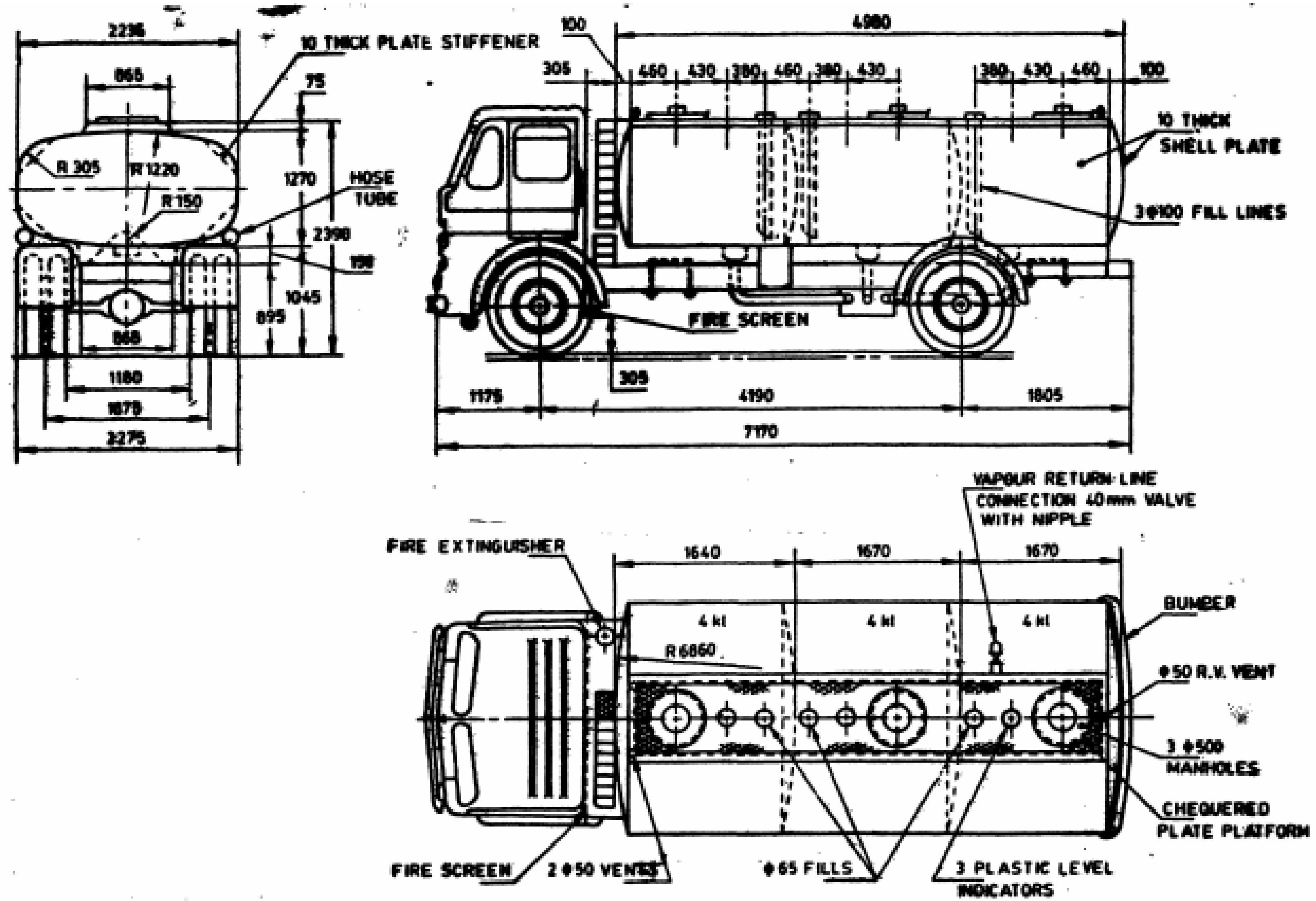
Sl No.	Part Name	Conforming to
i)	Shell, saddle, baffle, cleat, stiffener, flange, structural component, pipes, bolting, nuts, heating coils, manhole door, outlets, internal and outer ladders	Grades N1 or N2 or N3 or 304S1 or 304S2 or 201 or 301 or 301L or 301LN of IS 6911

3.1.2 *Width of Tank*

The maximum width of any tank and its service equipment/accessories shall be such that it does not project beyond the overall width of the vehicle on which it is mounted or by which it is being towed.

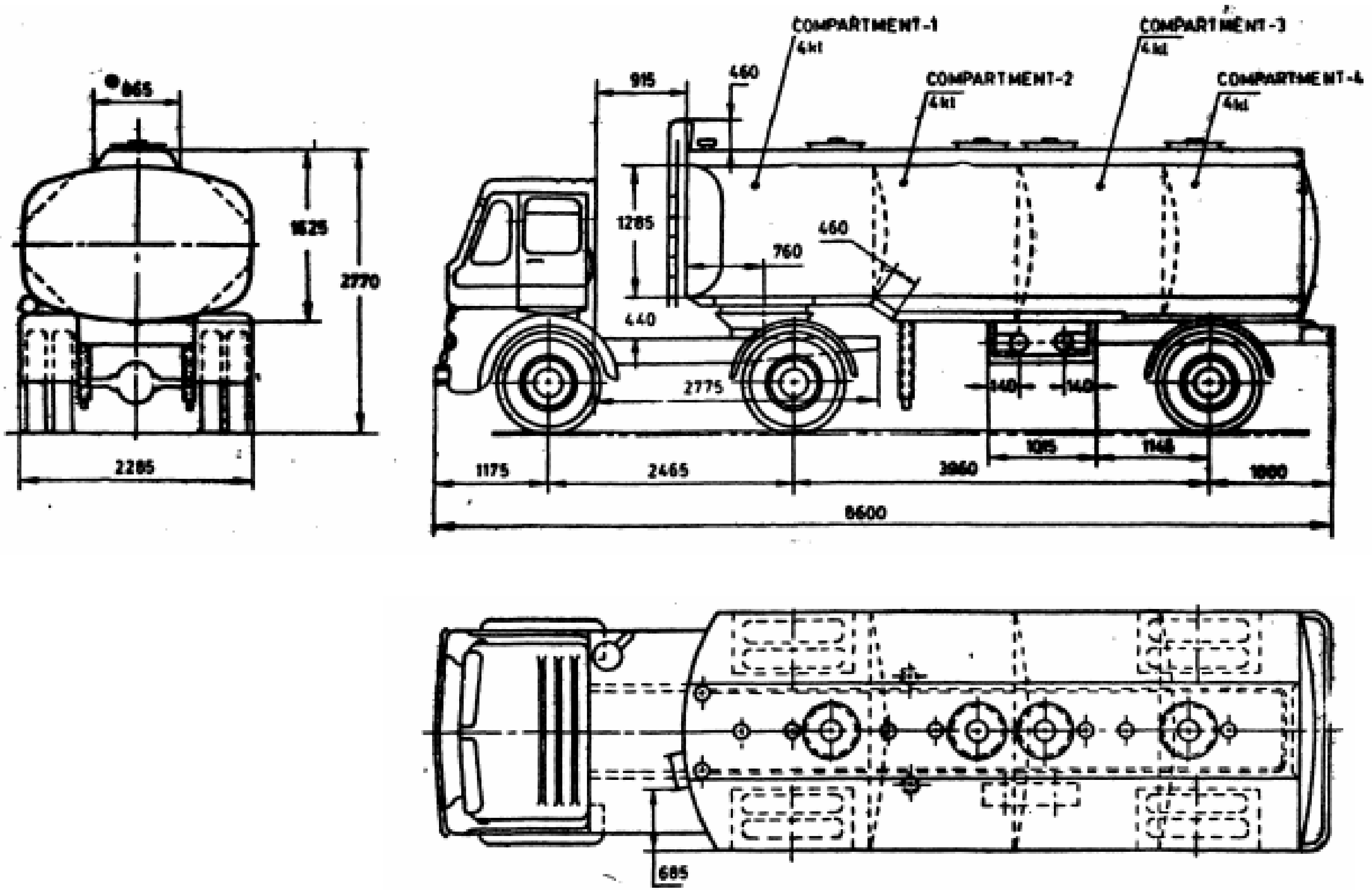
3.1.3 *Shape*

The shape of the tank may be horizontal, cylindrical, elliptical shape with dished or conical end. The mountings should be such that each compartment of the tank shall have a positive slope towards its outlet for ensuring complete drainage of the contents from the compartment.



All dimensions in millimetres.

FIG. 1 TRUCK MOUNTED ROAD TANKER



All dimensions in millimetres.

FIG. 2 TRAILER MOUNTED ROAD TANKER

3.1.4 *Material for Construction*

All materials used in the construction of tank including shell, end plates, partition, baffles, stiffeners and ancillary equipment such a manhole door, outlets, outlet valves, internal ladder shall all be made of stainless steel grades as specified in Table 1.

3.1.5 *Thickness of Material*

3.1.5.1 *Thickness of tank shells*

The thickness of tank shell shall be as specified in Table 2.

3.1.5.2 *Thickness of auxiliary items*

Minimum thickness of tank ends, partitions, baffles and stiffeners shall not be less than 2 mm for tanks having volume capacity up to and including 21 litres per centimeter and 2.7 mm for tanks having volume capacity exceeding 21 litres per centimeter, provided that the thickness of tank ends, shall in no case be less than the thickness of the tank shell as specified in **3.1.5.1**.

3.1.6 *Joints*

All joints of the tank, including shell, heads, partitions, baffles and stiffeners made from stainless steel shall preferably be welded by the inert gas arc welding process using argon as the shielding gas (*see* IS 2811). The filler rods and the bare electrodes for this purpose shall conform to grade S-B01L (that is, AWS ER 308L) of IS 1278. On visual examination, there shall be no cracks, notching or porous patches in the welded surface and surface adjacent to weld. The weld surface shall be regular and even. All welds of the tank shall be smooth and polished to minimum 220 grit.

3.2 Anchoring of Tank

The tank shall be securely anchored to the vehicle in a manner that shall not:

a) introduce undue concentration of stresses;
b) impair the stability and performance of the vehicle; and
c) allow any movement between the tank and the vehicle due to starting, stopping and turning.

Table 2 Thickness of Tank Shell for Tankers

(*Clause* 3.1.5.1)

Shell Radius and Capacities of Tanks	Distance (in mm) between attachment of partition, Baffle and Stiffeners		
	Up to and including 90 cm	Above 90 cm up to and including 135 cm	Above 135 cm
(1)	(2)	(3)	(4)
a) Minimum thickness for tanks having shell radius up to 175 cm and volume capacity:			
i) up to 21 litres per cm	2.0	2.0	2.0
ii) above 21 up to 21 litres per cm	2.0	2.6	2.6
iii) above 27 litres per cm	2.6	2.6	2.6
b) Minimum thickness for tanks having shell radius exceeding 175 cm but not exceeding 225 cm and volume capacity:			
i) up to 21 litres per cm	2.0	2.0	2.6
ii) above 21 up to 27 litres per cm	2.6	2.6	2.6
iii) above 27 litres per cm	2.6	2.6	3.3
c) Minimum thickness for tanks having shell radius exceeding 225 cm but not exceeding 310 cm and volume capacity:			
i) up to 21 litres per cm	2.6	2.6	2.6
ii) above 21 up to 27 litres per cm	2.6	2.6	3.3
iii) above 27 litres per cm	2.6	3.3	3.3
d) Minimum thickness for tanks having shell radius exceeding 310 cm and volume capacity:			
i) up to 21 litres per cm	2.6	3.3	3.3
ii) above 21 up to 27 litres per cm	3.3	3.3	3.3
iii) above 27 litres per cm	3.3	3.3	3.3

4 FITTINGS

4.1 Manhole

A circular top manhole of diameter not less than 450 mm shall be provided for each compartment in the tank. The manhole cover should be hinged to man way rim and be of quick release type. The cover shall be fitted with pressure and vacuum relief valves which are easily cleanable type. The manhole shall also be provided with a dust cover of hinged and quick release type. The dust cover shall be provided with a locking device.

4.2 Tank Supports

These shall be designed to suit the truck chassis or semi-trailer and shall be welded on either side of the tank for anchoring the complete tank to the supports of truck chassis or semi trailer.

4.3 Outlets

One outlet of diameter 63.5 mm (*see* IS 3382) shall be located at the bottom of each tank compartment with discharge pipes which shall be made of stainless steel grades as given in Table 1 with sufficient slope ending in 63.5 mm stainless steel two m-way valve of sanitary design. Outlet valves shall be suitably housed in stainless steel boxes with padlock doors. Arrangements shall be made for drainage of water from the boxes.

5 TESTING

5.1 The tank shall be tested for water tightness by subjecting it to a hydraulic pressure of 34 kPa for 5 min.

5.2 The quality of the welds shall be visibly checked for any cracks, gaps, porosities and any imperfections due to welding. In case, if required, dye penetration test (*see* IS 3658) may be performed to verify presence of any cracks. No cracks in weld joints are allowed.

5.3 Radiographic test at the joints may be carried out if specified and agreed to between the purchaser and the supplier (*see* IS 1182 and IS 4853).

6 MARKING

6.1 Each tank shall be marked legibly and permanently with the following particulars:

a) Manufacturer’s name or initial or trademark, if any;
b) The rated capacity of the tank in liters;
c) Batch or code number and year of manufacture;
d) Buyer’s logo or identification mark;
e) Material of construction; and
f) Any other markings which may be required by the purchaser and agreed upon between the supplier and the purchaser.

6.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

7 CLEAN-IN-PLACE (CIP)

Where the tanker has been used for non-edible materials, the greatest care must be taken by cleaning and inspection that all residues have been totally removed.

If steam or water are used for cleaning, the system must be drained and completely dried before oil is handled. If detergents or alkali are used, all surfaces with which they have been in contact shall be rinsed thoroughly with fresh water to ensure that no residues remain.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Oils and Oilseeds Sectional Committee, FAD 13

Organization	*Representative(s)*
Harcourt Butler Technological University, Kanpur	Dr R. K. Trivedi (***Chairman***)
All India Food Processors' Association (AIFPA), New Delhi	Shri D. V. Malhan Dr K. L. Gaba (*Alternate*)
Cargill India Pvt Ltd, Gurugram	Mr Neeraj Kumar Singh Ms Nidhi Bhatiwada
Center for Rural Development and Technology, IIT, Delhi	Shri S. N. Naik Shri Jatindra Sahu (*Alternate*)
CONCERT Trust, Chennai	Mr K. Krishnakumar Mr M. R. Krishnan (*Alternate*)
Consumer Guidance Society of India, Mumbai	Dr Sitaram Dixit Dr M. S. Kamath (*Alternate*)
CSIR Central Food Technological Research Institute (CFTRI), Mysore	Dr R. Subramanian Dr Ajay Wamanrao Tumaney (*Alternate*)
Defence Food Research Laboratory, Mysore	Dr A. D. Semwal Dr K. Jayathilakan (*Alternate*)
Directorate of Marketing and Inspection, Faridabad	Mr Thangraj Shri S. K. Singh (*Alternate*)
Directorate of Rapeseed - Mustard Research (DRMR), Bharatpur (Rajasthan)	Dr Anubhuti Sharma Dr Arun Kumar (*Alternate*)
FARE Labs Pvt Ltd, Gurugram	Mr D. Mathur Dr Meenakshi Sharma (*Alternate*)
Food Safety and Standards Authority of India, New Delhi	Ms Aiman Zaidi
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Indian Institute of Chemical Technology, Hyderabad	Dr Pradosh P. Chakrabarti Dr Sanjit Kanjilal (*Alternate*)
Indian Oilseeds and Produce Export Promotion Council	Mr Jitendra Bhushan Misra Mr Kishore Tanna (*Alternate*)
Indian Vanaspati Producers Association (IVPA), New Delhi	Shri S. P. Kamrah Shri S. K. Handu (*Alternate*)
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National Institute of Nutrition, Hyderabad	Dr M. Jeyakumar Dr P. Suryanarayana (*Alternate*)
National Institute for Food Technology Enterpreneurship and Management, Sonipat	Dr Sunil Pareek
National Oilseeds and Vegetable Oils Development Board (NOVOD), Gurugram	Shri Swapan Kumar Pal Shri Devdutt (*Alternate*)

Organization	*Representative(s)*
Oil Technologists' Association of India (OTAI), Northern Zone, Delhi	MR C. S. JOSHI DR R. P. SINGH (*Alternate*)
The Solvent Extractors Association of India, Mumbai	DR PRABODH HALDE MR AKSHAY MODI (*Alternate*)
VOICE, New Delhi	SHRI ASHOK KANCHAN SHRI H. WADAWA (*Alternate*)
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In Personal Capacity	PROF AMIT P. PRATAP
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Member Secretary

DR BHAWANA
SCIENTIST 'D' (FAD), BIS

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices: *Telephones*

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002
2323 7617
2323 3841

Eastern : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi
KOLKATA 700054
2337 8499, 2337 8561
2337 8626, 2337 9120

Northern : Plot No. 4-A, Sector 27-B, Madhya Marg
CHANDIGARH 160019
265 0206
265 0290

Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113
2254 1216, 2254 1442
2254 2519, 2254 2315

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
MUMBAI 400093
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